Fig. 1 *(PRIOR ART)*

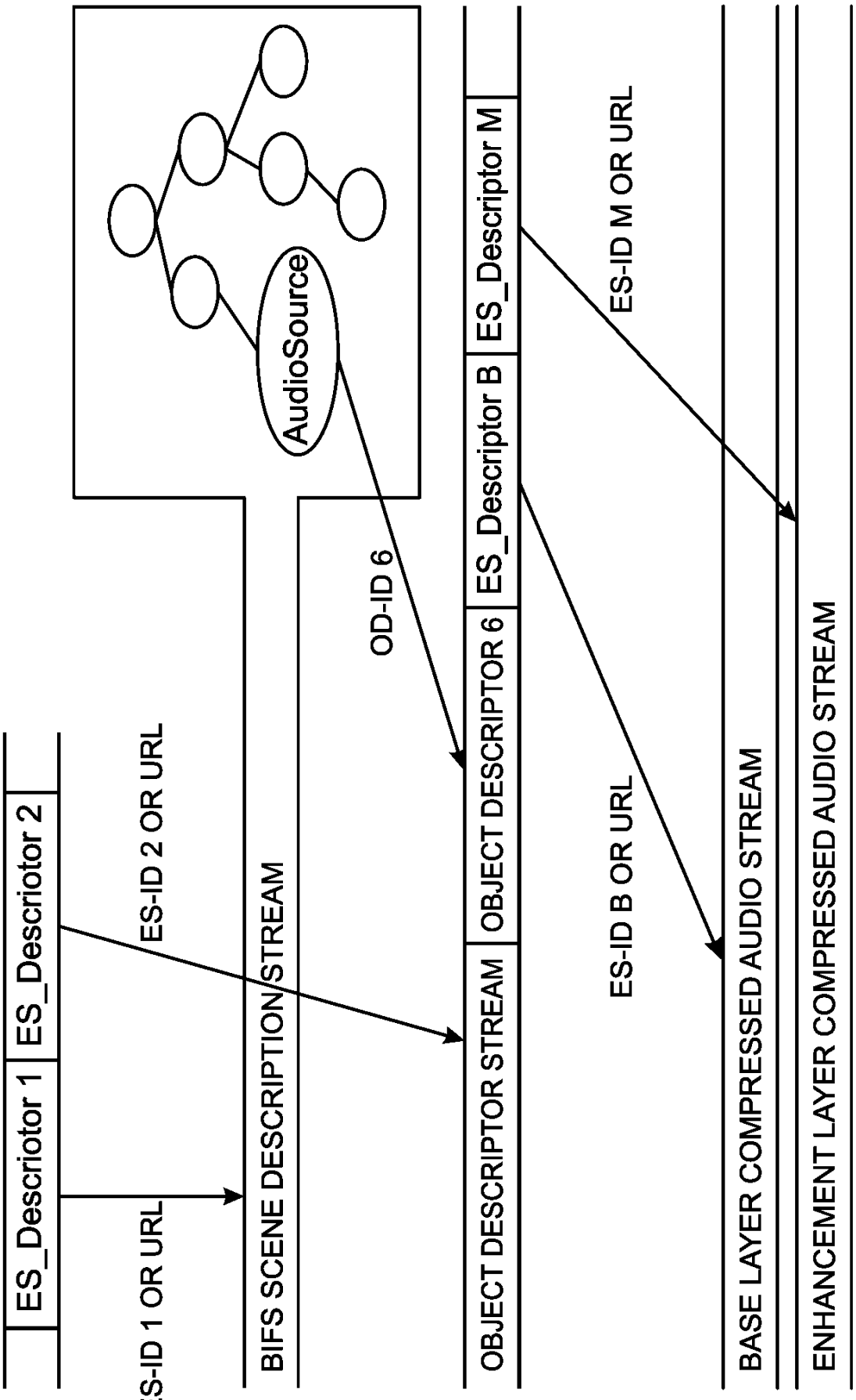


Fig. 2

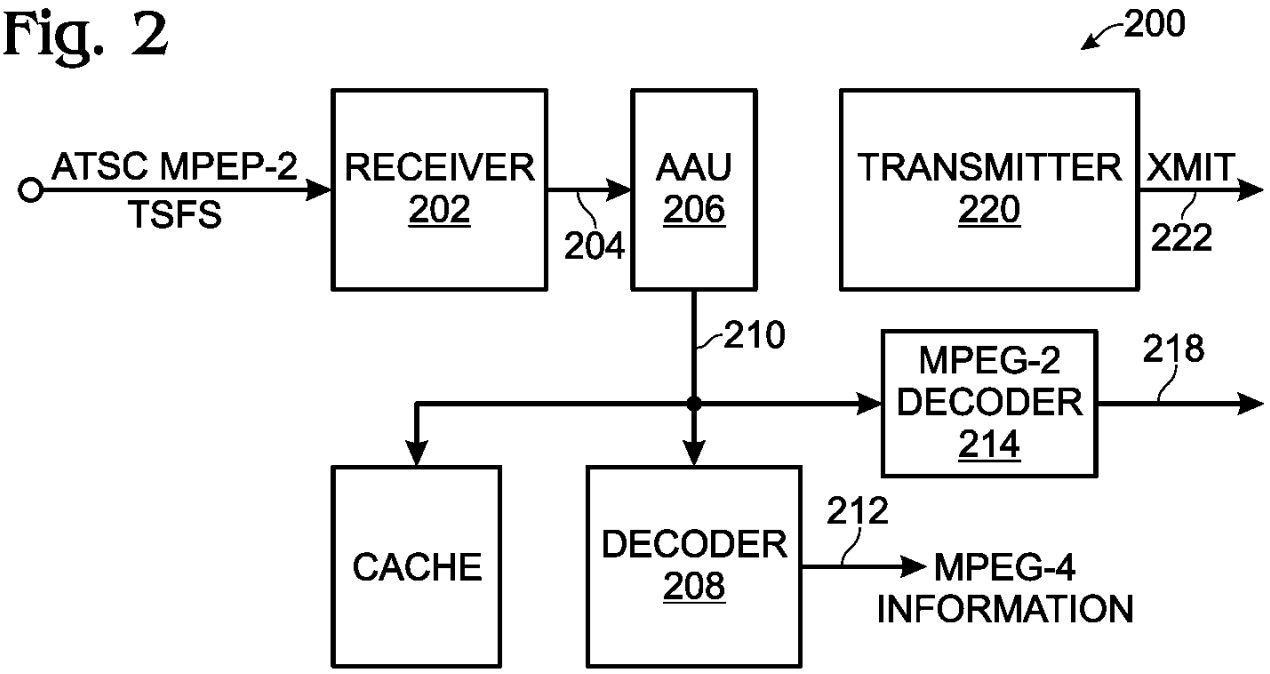

200
ATSC MPEP-2
TSFS
RECEIVER
202
204
AAU
206
TRANSMITTER
220
XMIT
222
210
MPEG-2
DECODER
214
218
CACHE
DECODER
208
212
MPEG-4
INFORMATION

Fig. 4

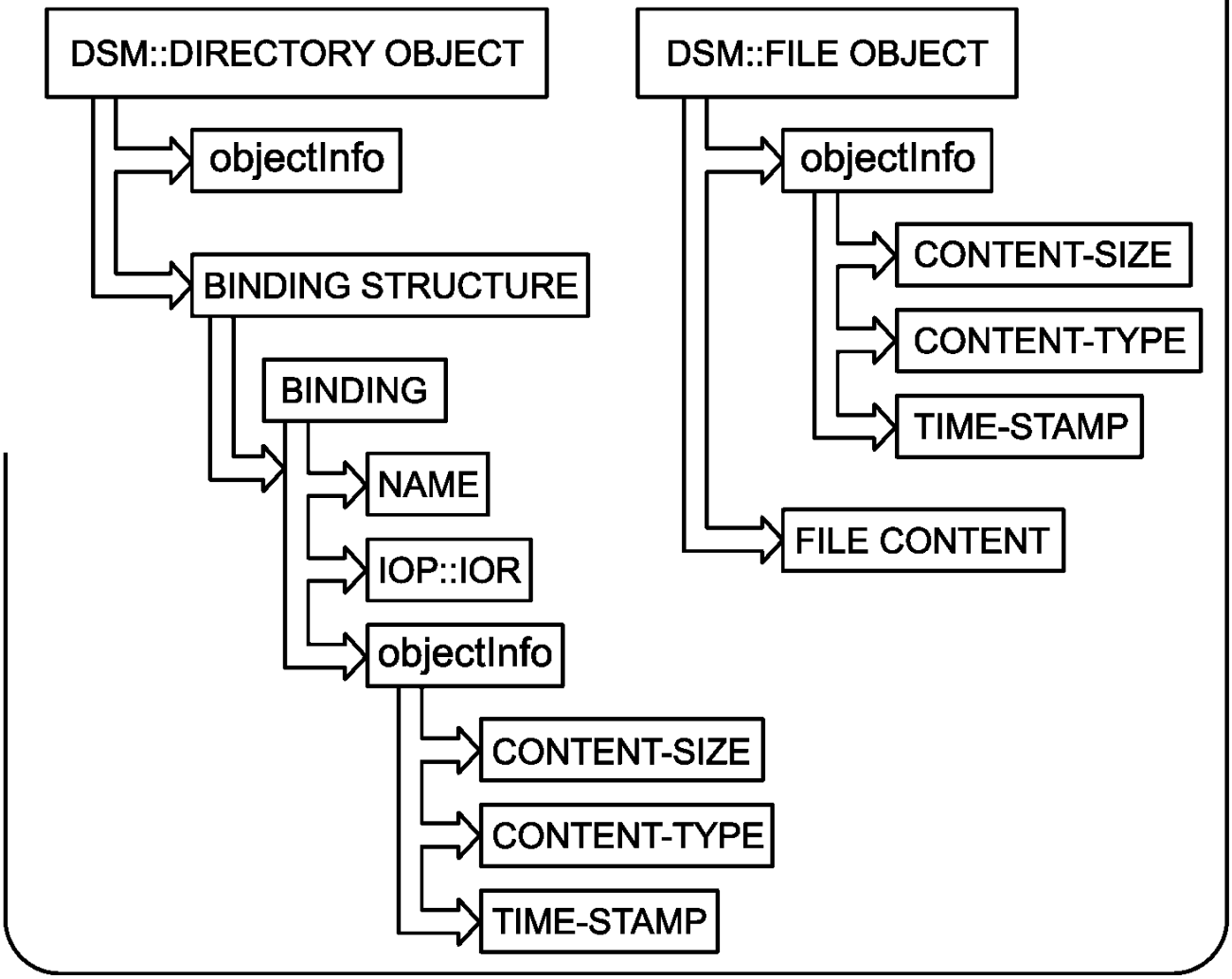

DSM::DIRECTORY OBJECT
objectInfo
BINDING STRUCTURE
BINDING
NAME
IOP::IOR
objectInfo
CONTENT-SIZE
CONTENT-TYPE
TIME-STAMP
DSM::FILE OBJECT
objectInfo
CONTENT-SIZE
CONTENT-TYPE
TIME-STAMP
FILE CONTENT

Fig. 3

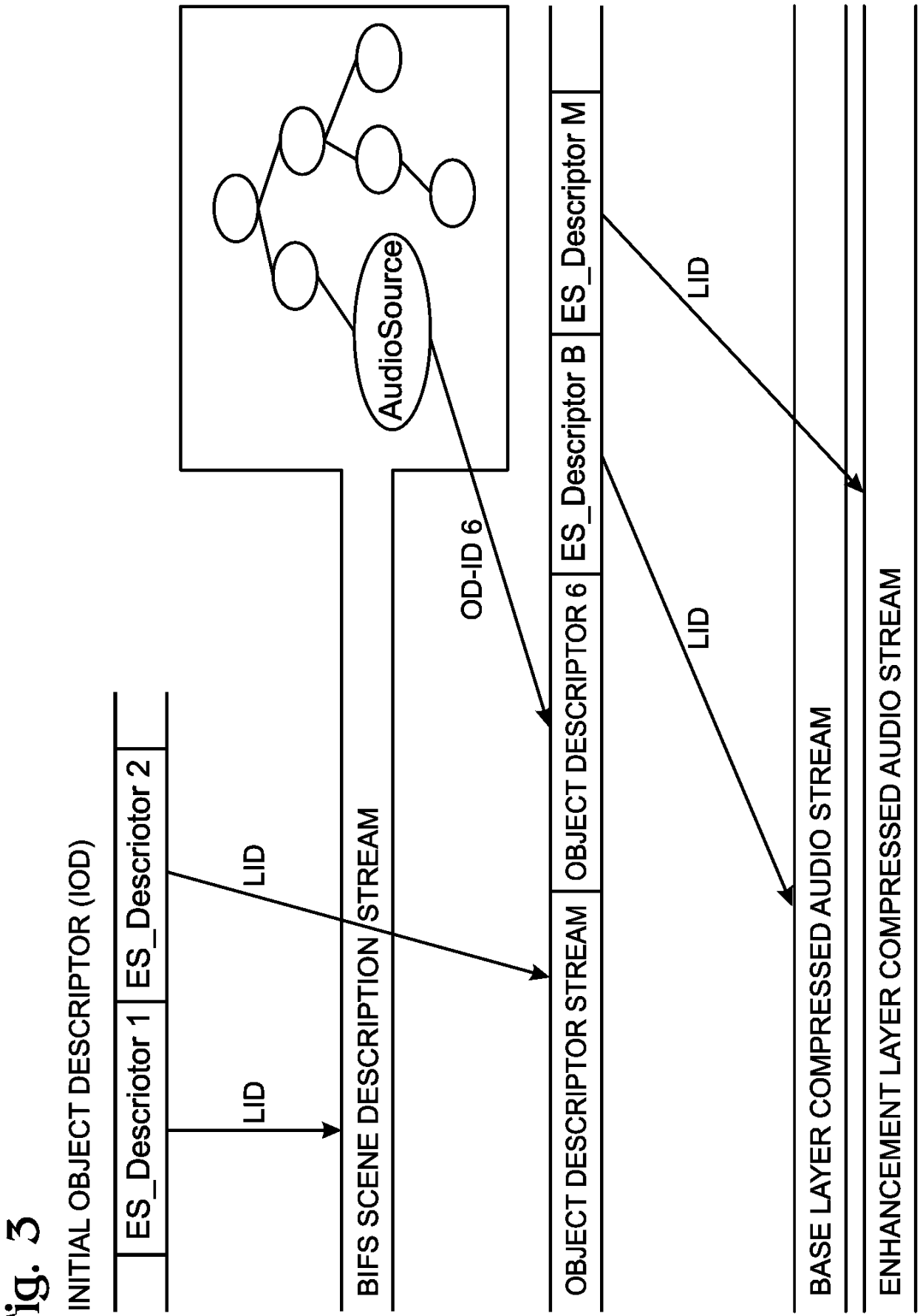

INITIAL OBJECT DESCRIPTOR (IOD)
ES_Descriotor 1
ES_Descriotor 2
LID
LID
BIFS SCENE DESCRIPTION STREAM
AudioSource
OD-ID 6
OBJECT DESCRIPTOR STREAM
OBJECT DESCRIPTOR 6
ES_Descriptor B
ES_Descriptor M
LID
LID
BASE LAYER COMPRESSED AUDIO STREAM
ENHANCEMENT LAYER COMPRESSED AUDIO STREAM

Fig. 5

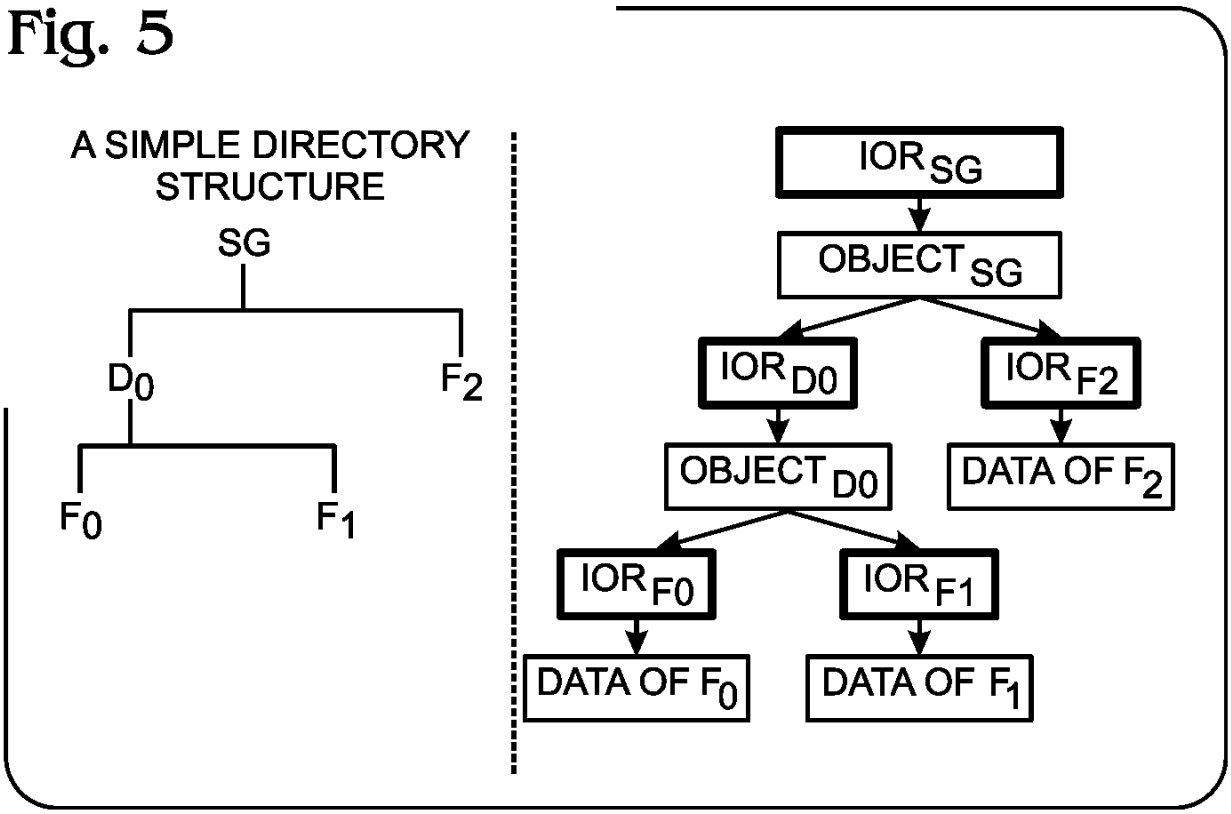

A SIMPLE DIRECTORY STRUCTURE
SG
D0
F2
F0
F1
IOR SG
OBJECT SG
IOR D0
IOR F2
OBJECT D0
DATA OF F2
IOR F0
IOR F1
DATA OF F0
DATA OF F1

Fig. 6

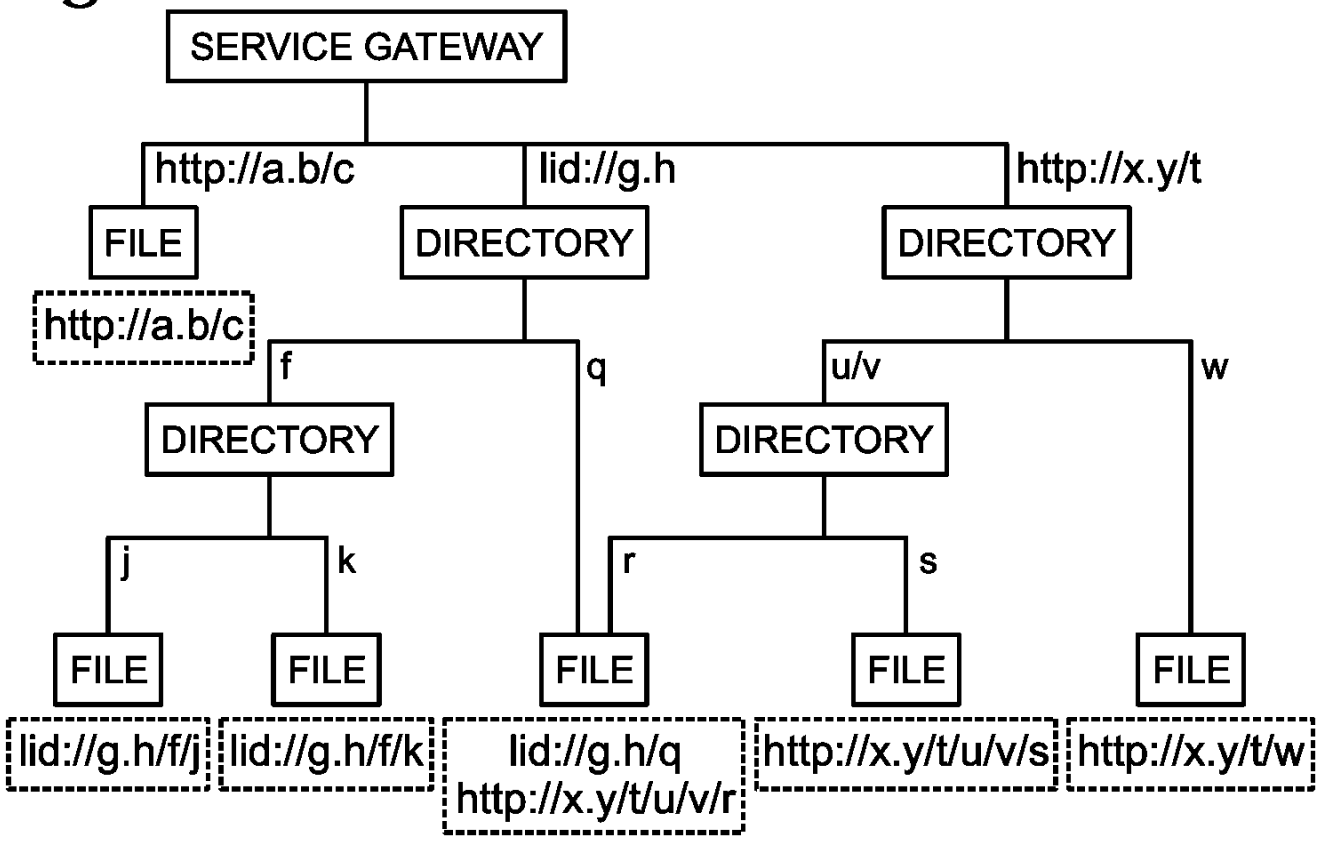

SERVICE GATEWAY
http://a.b/c
lid://g.h
http://x.y/t
FILE
DIRECTORY
DIRECTORY
http://a.b/c
f
q
u/v
w
DIRECTORY
DIRECTORY
j
k
r
s
FILE
FILE
FILE
FILE
FILE
lid://g.h/f/j
lid://g.h/f/k
lid://g.h/q
http://x.y/t/u/v/r
http://x.y/t/u/v/s
http://x.y/t/w

Fig. 7

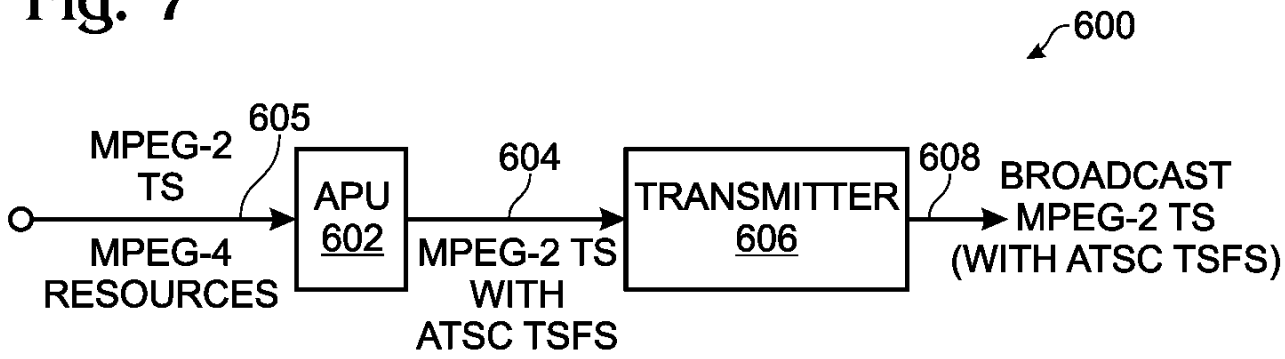

600
605
MPEG-2 TS
MPEG-4 RESOURCES
APU 602
604
MPEG-2 TS WITH ATSC TSFS
TRANSMITTER 606
608
BROADCAST MPEG-2 TS (WITH ATSC TSFS)

Fig. 9

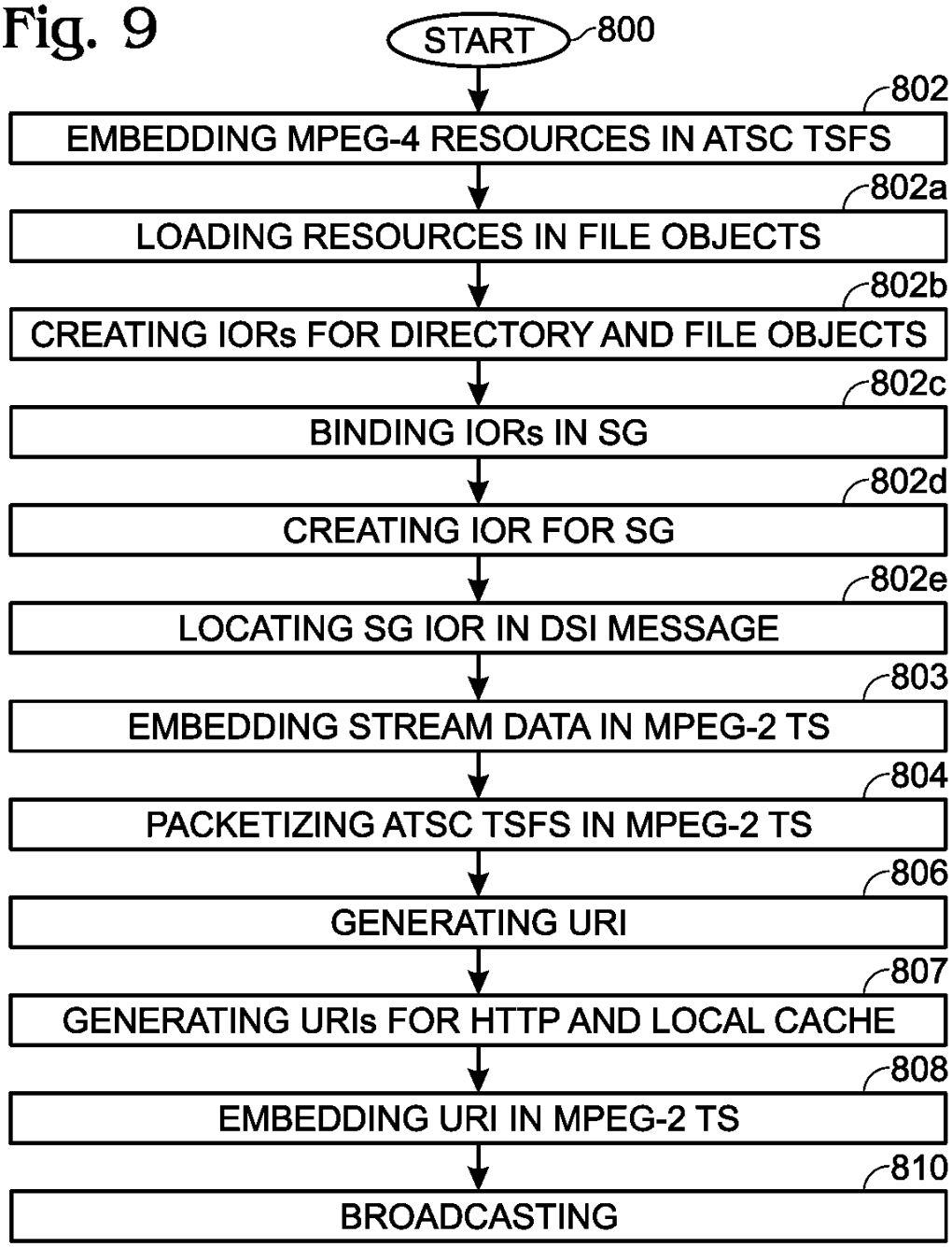
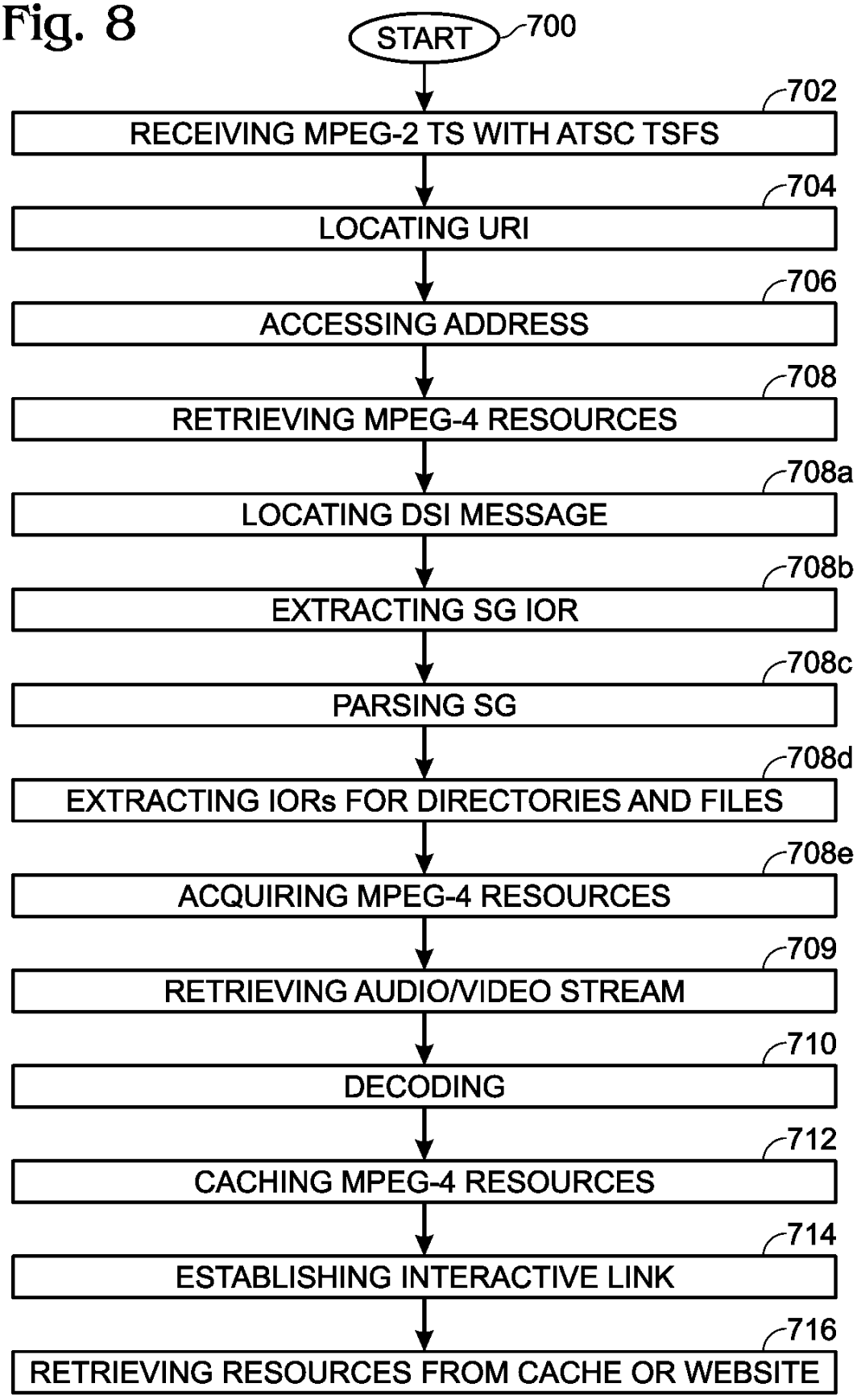

START
800
802
EMBEDDING MPEG-4 RESOURCES IN ATSC TSFS
802a
LOADING RESOURCES IN FILE OBJECTS
802b
CREATING IORs FOR DIRECTORY AND FILE OBJECTS
802c
BINDING IORs IN SG
802d
CREATING IOR FOR SG
802e
LOCATING SG IOR IN DSI MESSAGE
803
EMBEDDING STREAM DATA IN MPEG-2 TS
804
PACKETIZING ATSC TSFS IN MPEG-2 TS
806
GENERATING URI
807
GENERATING URIs FOR HTTP AND LOCAL CACHE
808
EMBEDDING URI IN MPEG-2 TS
810
BROADCASTING

Fig. 8


START
700
702
RECEIVING MPEG-2 TS WITH ATSC TSFS
704
LOCATING URI
706
ACCESSING ADDRESS
708
RETRIEVING MPEG-4 RESOURCES
708a
LOCATING DSI MESSAGE
708b
EXTRACTING SG IOR
708c
PARSING SG
708d
EXTRACTING IORs FOR DIRECTORIES AND FILES
708e
ACQUIRING MPEG-4 RESOURCES
709
RETRIEVING AUDIO/VIDEO STREAM
710
DECODING
712
CACHING MPEG-4 RESOURCES
714
ESTABLISHING INTERACTIVE LINK
716
RETRIEVING RESOURCES FROM CACHE OR WEBSITE